

rivers. At Louisville, Ky., the Ohio River rose to 27.4 feet, 3.4 feet above the danger-line. At Little Rock, Ark., the Arkansas River remained nearly stationary at 25.2 feet. Freshets occurred in western New England. The Connecticut River rose rapidly at Hartford, Conn., submerging the lower part of the city. At Brattleboro, Vt., the Connecticut River rose 7 feet in 10 hours, and about Barre, Vt., many bridges were washed away. In Washington County, Vt., the damage by flood was estimated at \$50,000. High water was reported along the Genesee River, N. Y., and in streams in northern Pennsylvania and western Maryland. The James River rose rapidly at Lynchburg, Va., on the 3d and 4th, reaching 14.0 feet at 7.15 p. m., 4th, after which it subsided. The Sciota River fell rapidly at Columbus, Ohio. Streams were high in parts of Tennessee and Arkansas. At Saint Paul, Minn., the Mississippi River rose slowly and became stationary at 14.7 feet, 0.7 foot above the danger-line, on the 4th, without causing serious damage.

During the 4th the river fell slowly at Louisville, Ky. Floods occurred in Vermont, New Hampshire, and Connecticut. Swollen streams were reported throughout eastern New York. Damage by flood was reported in eastern Tennessee and northern Alabama. Rivers and streams in Ohio were reported falling. On the 6th the Connecticut River at Hartford was the highest, 24.5 feet, since 1878. High water in the Alabama River flooded bottom lands about Montgomery, Ala. The Red River of the North was falling slowly at Saint Vincent, Minn.

On the 7th no change had occurred in the stage of the Mississippi River at Saint Paul, Minn., since the 4th. At Cairo, Ill., the river reached a stage of 49.1 feet at 8 a. m., flooding the tracks of the Iron Mountain Railroad at Birds Point, and submerging the Cotton Belt Road for a distance of 5 miles out of the city. At Cincinnati the Ohio River reached 51 feet, a rise of 2.1 feet in 24 hours, after which it began to fall. The Red River of the North continued to fall slowly. The Mississippi River passed the danger-line at Dubuque, Iowa, on the 8th. Overflow from the Mississippi and Ohio rivers inundated large areas of wheat land about Cairo, Ill., on the 10th. A crevasse 200 feet in width occurred in the levee  $1\frac{1}{2}$  mile below Lakeport, Ark., about 4 a. m. of the 11th.

Melting snow swelled the Columbia and Snake rivers and tributaries in Idaho and the north Pacific coast states. On the 12th the Mississippi River was stationary at 16.7 feet, 0.7 of a foot above the danger-line, at Dubuque, Iowa. The Mississippi reached the danger-line at Keokuk, Iowa. On the 13th the Mississippi River continued to rise slowly at Keokuk, Iowa. The Lakeport (Ark.) crevasse had widened to 500 feet and a large tract of cotton land was flooded. About 6 a. m. of the 14th a crevasse about 200 feet in width occurred in the levee at Brooks Mill, Chicot County, Ark. A break about 50 feet in width occurred on Bayou Lafourche, near Lafourche Crossing, at 3 a. m. On the 15th a crevasse occurred at Grand Lake, Ark. A third crevasse was reported in Chicot County, in the Matthews Bend levee. The break at Brooks Mill was enlarging rapidly.

On the 17th another crevasse occurred in the Mississippi levee above Grand Lake in Chicot County, Ark. The levees in Louisiana and Mississippi were reported in excellent

condition. Freshets were reported in the Kennebec River, Maine. A report from Cleveland, Ohio, stated that the Cuyahoga River rose rapidly, inundating low-lying sections, carrying away vast quantities of lumber, destroying houses and railroad tracks, and drowning 6 persons and a quantity of stock. Rivers of the north Pacific coast states were reported rising rapidly. On the 18th and 19th floods were reported in the streams of Washington and Oregon. On the 21st the river fell below the danger-line at Keokuk, Iowa. At Cairo, Ill., the Ohio River was falling rapidly.

On the 23d a break occurred in the levee on Bayou Lafourche, 4 miles below Lafourche Crossing. A break 500 feet in width occurred in East Carroll Parish, near Lake Providence. On the 24th the crevasse near Lake Providence was 1,200 feet in width and widening rapidly. On the 29th a break occurred in the levee at Amos Bayou, about 14 miles above Arkansas City, on the Arkansas side of the Mississippi River. At the close of the month large portions of East Carroll and Madison parishes, La., were submerged.

#### STAGE OF WATER IN RIVERS.

The following table shows the danger-points at the various river stations; the highest and lowest stages for the month, with the dates of occurrence; and the monthly ranges:

*Heights of rivers above low-water mark, May, 1893.*

Stations.	Danger-point on gauge.	Highest water.		Lowest water.		Monthly range.
		Height.	Date.	Height.	Date.	
<i>Red River.</i>	<i>Feet.</i>	<i>Feet.</i>		<i>Feet.</i>		<i>Feet.</i>
Shreveport, La. ....	29.2	24.0	23, 24	14.3	1	9.7
<i>Arkansas River.</i>						
Fort Smith, Ark. ....	22.0	26.8	1	5.0	27	21.8
Little Rock, Ark. ....	23.0	25.2	3	9.5	27	15.7
<i>Missouri River.</i>						
Fort Buford, N. Dak. * ..	25.0	13.3	25	7.9	4-6	5.4
Bismarck, N. Dak. ....	75.0	8.6	27, 28	2.4	7	6.2
Pierre, S. Dak. ....	13.0	4.0	31	0.2	14, 15	3.8
Sioux City, Iowa. ....	18.7	11.9	29	7.9	22	4.0
Omaha, Nebr. ....	18.0	11.1	30, 31	7.9	21, 22, 24, 25	3.2
Kansas City, Mo. ....	21.0	13.4	31	8.7	23, 24	4.7
<i>Mississippi River.</i>						
Saint Paul, Minn. ....	14.0	14.7	5-7	9.7	24, 25	5.0
La Crosse, Wis. ....	10.0	11.9	9	9.7	27-29	2.2
Dubuque, Iowa. ....	16.0	16.7	11-14	12.9	31	3.8
Davenport, Iowa. ....	15.0	13.6	14	10.7	31	2.9
Keokuk, Iowa. ....	14.0	14.9	15	12.2	31	2.7
Hannibal, Mo. ....	17.0	16.6	28	14.5	31	2.3
Saint Louis, Mo. ....	30.0	31.5	3	22.4	24, 25	9.1
Cairo, Ill. ....	40.0	49.3	9-13	34.3	26	15.0
Memphis, Tenn. ....	33.0	35.2	15-17	31.0	30, 31	4.2
Vicksburg, Miss. ....	41.0	48.3	22, 23	41.4	1	6.9
New Orleans, La. ....	13.0	16.1	31	13.3	1	2.8
<i>Ohio River.</i>						
Parkersburg, W. Va. ....	38.0	31.0	20	8.0	31	23.0
Cincinnati, Ohio. ....	45.0	51.0	7	19.9	31	31.1
Louisville, Ky. ....	24.0	27.4	3	7.8	31	19.6
<i>Cumberland River.</i>						
Nashville, Tenn. ....	40.0	20.2	9	6.5	28	13.7
<i>Tennessee River.</i>						
Chattanooga, Tenn. ....	33.0	30.0	7	4.6	28	25.4
<i>Monongahela River.</i>						
Pittsburg, Pa. ....	22.0	19.8	18	4.5	31	15.3
<i>Savannah River.</i>						
Augusta, Ga. ....	32.6	12.4	5	6.1	29	6.3
<i>Willamette River.</i>						
Portland, Oregon. ....	15.0	21.0	22	9.8	1	11.2
<i>Susquehanna River.</i>						
Harrisburg, Pa. ....	17.0	16.5	6	3.7	31	12.8
<i>Alabama River.</i>						
Montgomery, Ala. ....	48.0	24.9	6	3.3	28, 29	21.6
<i>James River.</i>						
Lynchburg, Va. ....	18.0	14.0	4	1.4	23, 26-28	12.6
<i>Des Moines River.</i>						
Des Moines, Iowa. ....	19.0	10.6	12	6.0	29-31	4.6
<i>Sacramento River.</i>						
Red Bluff, Cal. ....	22.0	8.5	17	4.9	30, 31	3.6
Sacramento, Cal. ....	25.0	24.8	16-18	22.8	31	2.0

#### ATMOSPHERIC ELECTRICITY.

##### THUNDERSTORMS.

Description of the more severe thunderstorms reported for the month is given under "Local storms."

Thunderstorms were reported as follows: East of the Rocky

Mountains they were reported in the greatest number of states, 29, on the 23d and 27th; in 26 on the 1st and 28th; in 20 to 25 on the 6th, 21st, 26th, 29th, 30th, and 31st; in 15 to 19 on the 2d, 3d, 4th, 11th, 13th, 14th, 15th, 20th, and 24th; in 10

to 14 on the 5th, 7th, 8th, 10th, 12th, 22d, and 25th; in 5 to 9 on the 9th, 16th, and 19th; and in 1 to 4 on the 17th and 18th. There were no dates on which thunderstorms were not reported.

East of the Rocky Mountains thunderstorms were reported on the greatest number of dates, 24, in Missouri; on 23 in Florida; on 15 to 20 in Alabama, Arkansas, Georgia, Illinois, Iowa, Kansas, Louisiana, Mississippi, Nebraska, New Jersey, New York, Ohio, Pennsylvania, Tennessee, Texas, and Virginia; on 10 to 14 in Indiana, Kentucky, Maryland, Massachusetts, Michigan, Montana, North Carolina, South Carolina, South Dakota, West Virginia, and Wisconsin; on 5 to 9 in Connecticut, District of Columbia, Minnesota, North Dakota, and Oklahoma; and on 1 to 4 in Delaware, Indian Territory, Maine, New Hampshire, Rhode Island, and Vermont.

West of the Rocky Mountains thunderstorms were reported

in Arizona, on the 10th to 13th, and 15th; in California on the 4th, 7th, 8th, 10th to 14th, 16th, 17th, 26th, and 27th; in Colorado on the 2d to 8th, 10th, 13th to 18th, 21st, 26th, 27th, 28th, and 31st; in Idaho on the 16th, 17th, 22d, and 29th; in Nevada on the 5th, 7th, 8th, and 12th; in New Mexico on the 5th, 6th, 7th, 9th, 13th, and 14th; in Oregon on the 2d, 3d, 15th, 17th, 25th, and 31st; in Utah on the 9th, 21st, and 26th; in Washington on the 2d, 7th, 15th, 16th, 17th, and 25th; and in Wyoming on the 3d, 4th, 5th, 18th, 19th.

#### AUROSAS.

On the 7th auroras were reported in New England, New Jersey, New York, the Lake region, and the extreme upper Mississippi, Red River of the North, and upper Missouri valleys. On the 9th auroras were noted at points in the Lake region.

### STATE WEATHER SERVICES.

[Temperature in degrees Fahrenheit; precipitation, including melted snow, in inches and hundredths.]

The following extracts and summaries are republished from reports for May, 1893, of the directors of the various state weather services:

#### ALABAMA.

*Temperature.*—The mean was 2.5 below the normal; maximum, 96, at Healing Springs, 25th; minimum, 38, at Valley Head, 4th; greatest monthly range, 58, at Healing Springs; least monthly range, 80, at Daphne.

*Precipitation.*—The average was 3.88 above the normal; greatest monthly, 18.05, at Union; least monthly, 4.03, at Geneva.

*Wind.*—Prevailing direction, south.—*P. H. Mell, Observer, Weather Bureau, Auburn, director.*

#### ARIZONA.

*Temperature.*—The mean was 1.7 above the normal; maximum, 110, at Buckeye, 21st; minimum, 20, at Whipple Barracks, 3d; greatest monthly range, 68, at Holbrook and San Carlos; least monthly range, 48, at Saint Helena Ranch.

*Precipitation.*—Greatest monthly, 2.18, at Fort Apache; least monthly, 0.00, at Calabasas.

*Wind.*—Prevailing direction, southwest.—*W. Burrows, Observer, Weather Bureau, Tucson, director.*

#### ARKANSAS.

*Temperature.*—The mean was 0.5 below the normal; maximum, 94, at Hot Springs, 25th, at Pine Bluff, 19th, and at Texarkana, 27th; minimum, 38, at Keesees Ferry, 2d; greatest monthly range, 54, at Keesees Ferry; least monthly range, 37, at Marcella.

*Precipitation.*—The average was 4.72 above the normal; greatest monthly, 19.88, at Lonoke; least monthly, 5.21, at Kirby.

*Wind.*—Prevailing direction, south.—*F. H. Clarke, Local Forecast Official, Weather Bureau, Little Rock, director.*

#### CALIFORNIA.

*Temperature.*—The mean was 2.0 below the normal; maximum, 108, at Needles, 31st; minimum, 28, at Meadow Valley, 18th, and at Fort Bidwell, 1st and 21st; greatest monthly range, 64, at Tulare; least monthly range, 19, at Poway.

*Precipitation.*—The average was 0.11 below the normal; greatest monthly, 5.61, at Shasta; least monthly, 0.00, at a number of stations.

*Wind.*—Prevailing direction, west.—*J. A. Barwick, Observer, Weather Bureau, Sacramento, director.*

#### COLORADO.

*Temperature.*—The mean was 2.0 below the normal; maximum, 98, at Downing, 16th; minimum, -2, at Pikes Peak, 1st.

*Precipitation.*—The average was about 0.50 below the normal; greatest monthly, 6.80, at Saint Cloud; least monthly, 0.09, at Las Animas.

*Wind.*—Prevailing direction, west.—*J. J. Gilligan, Observer, Weather Bureau, Denver, director.*

#### FLORIDA.

*Temperature.*—The mean was about 2.0 above the normal; maximum, 101, at Micco, 29th; minimum, 49, at New Smyrna, 5th; greatest monthly range, 46, at Plant City; least monthly range, 19, at Key West.

*Precipitation.*—The average was about 0.50 below the normal; greatest monthly, 7.98, at Kissimmee; least monthly, 1.64, at Tarpon Springs.

*Wind.*—Prevailing direction, southeast.—*E. R. Demain, Observer, Weather Bureau, Jacksonville, director.*

#### GEORGIA.

*Temperature.*—Maximum, 100, at Americus, Cordele, and Hawkinsville,

21st; minimum, 38, at Diamond, 4th and 19th; greatest monthly range, 57, at Americus and Hawkinsville; least monthly range, 35, at Monticello.

*Precipitation.*—Greatest monthly, 7.68, at Thomasville; least monthly, 1.20, at Darien.

*Wind.*—Prevailing direction, west.—*Park Morrill, Local Forecast Official, Weather Bureau, Atlanta, director.*

#### IDAHO.

The month was cold and unseasonable.

*Temperature.*—Maximum, 91, at Payette, 15th; minimum, 12, at Lake, 1st; greatest monthly range, 73, at Lake; least monthly range, 46, at Moscow.

*Precipitation.*—Greatest monthly, 3.75, at Fort Sherman; least monthly, 0.35, at Lake.

*Wind.*—Prevailing direction, southwest.—*J. H. Smith, Observer, Weather Bureau, Idaho Falls, director.*

#### ILLINOIS.

*Temperature.*—The mean was 2.7 below the normal; maximum, 95, at McLeansboro, 20th; minimum, 25, at Fort Sheridan, 1st.

*Precipitation.*—The average was 0.10 below the normal; greatest monthly, 8.05, at Atwood; least monthly, 1.60, at Hennepin.

*Wind.*—Prevailing direction, northwest.—*John Craig, Observer, Weather Bureau, Springfield, director.*

#### INDIANA.

*Temperature.*—The mean was 1.4 below the normal; maximum, 94, at Bedford, 22d; minimum, 81, at Cambridge City, 19th; greatest monthly range, 58, at Bedford; least monthly range, 39, at Degonia Springs.

*Precipitation.*—The average was 0.06 above the normal; greatest monthly, 9.60, at Marengo; least monthly, 1.45, at Muncie.

*Wind.*—Prevailing direction, southwest.—*Prof. H. A. Huston, Lafayette, director; C. F. R. Wappenhans, Local Forecast Official, Weather Bureau, assistant.*

#### IOWA WEATHER AND CROP SERVICE.

*Temperature.*—The mean was 3.0 below the normal; maximum, 96, at Glenwood, 9th; minimum, 26, at Atlantic, 2d; greatest monthly range, 68, at Atlantic and Glenwood; least monthly range, 42, at Delaware.

*Precipitation.*—The average was about 1.00 below the normal; greatest monthly, 5.82, at Carroll; least monthly, 1.65, at Sibley.

*Wind.*—Prevailing direction, northwest.—*J. R. Sage, Des Moines, director; G. M. Chappel, Local Forecast Official, Weather Bureau, assistant.*

#### KANSAS.

*Temperature.*—The mean was 1.8 below the normal; maximum, 101, at Syracuse, 20th; minimum, 17, at Colby, 1st; greatest monthly range, 80, at Syracuse; least monthly range, 44, at Lawrence.

*Precipitation.*—The average was 1.51 below the normal; greatest monthly, 7.62, at Lawrence; least monthly, 0.40, at Shields.

*Wind.*—Prevailing direction, south.—*T. B. Jennings, Observer, Weather Bureau, Topeka, director.*

#### KENTUCKY.

*Temperature.*—The mean was about 3.0 below the normal; maximum, 96, at Louisa, 21st; minimum, 37, at Harrodsburg, 18th; greatest monthly range, 55, at Louisa; least monthly range, 32, at South Fork.

*Precipitation.*—The average was about 2.00 above the normal; greatest monthly, 10.41, at Franklin; least monthly, 2.59, at Catlettsburg.